# CHAPTER 2

# METHODOLOGY FOR CONSTRUCTION EQUIPMENT

## SECTION I. GENERAL

2-1. Contents. This chapter provides the methodology used to compute the total hourly ownership and operating rates for construction equipment and marine equipment (except dredging plant). This detailed methodology includes the formulas and factors used to develop both total hourly rates and hourly standby rates. If the equipment is determined to be older than its estimated economic life (overage) or was purchased used, refer to Chapter 3, Adjustments to Rates.

2-2. Basis for Equipment Rates. The hourly rates shown in TABLE 2-1, Hourly Equipment Ownership and Operating Expense Schedule reflect catalog list prices of three-year old equipment manufactured in 1996. Area factors are used to compute regional ownership and operating expenses and are listed in APPENDIX B, Area Factors. This hourly rate methodology assumes that equipment furnished to the job is in sound, workable condition. Furthermore, the methodology applies only to equipment which prime contractors or subcontractors either own or control. These hourly rates and cost factors do not represent rental charges for those in the business of renting equipment.

2-3. Total Hourly Rate. Hourly rates for average conditions are shown in TABLE 2-1 and computed based on a 40-hour workweek. The hourly rate is the sum of ownership and operating costs. TABLE 2-2, Hourly Rate Elements, contains all individual rate elements for both average and severe conditions. An example of the methodology used to compute the total hourly rate is shown in Figure 2-1. For standby calculation, see Section IX, Standby Hourly Rate.

a. Ownership Cost Elements. The ownership portion of the rate consists of an allowance for depreciation and facilities capital cost of money (FCCM).

b. Operating Cost Elements. Operating costs include allowances for the following:

Fuel
Filters, oil, and grease (FOG) (includes servicing)
Repairs, which include maintenance and major overhauls
Tire wear (replacement)
Tire repair

c. Exclusions to Hourly Rates. Total hourly rates for owning and operating equipment do not include allowances for the following:

Operating labor
Mobilization and demobilization

Field office overhead expenses
Home office or G&A overhead expenses
Investment tax credit
Contingency allowance
Profit

It should also be noted that replacement cost is not included in the rates, as it is not an allowable item of cost per FAR 31.105(d)(2)(i).

d. Other Ownership Elements. The following elements of cost are not included in the total hourly rates. These costs are allowable and would normally be included in the contractor's field office or home office overhead rate calculation.

(1) License fees, property taxes, storage, and insurance costs are considered indirect costs and are not included in the total hourly rates.

(2) Jobsite security, inspection fees, record keeping, mechanic's training, and highway permits are also not included in the total hourly rates.

## SECTION II. OPERATING CONDITIONS

2-4. Average, Difficult, or Severe Conditions. Operating conditions may be average, difficult, or severe. Rates for both average and severe operating conditions are determined in accordance with APPENDIX C, Guide for Selecting Operating Conditions. Rates for the difficult condition is the arithmetic mean of the average and the severe rates. If only the average rate is shown in TABLE 2-2, that rate will apply for all operating conditions. Average condition rates are included in both TABLE 2-1 and TABLE 2-2. Only TABLE 2-2 contains the severe condition rates.

2-5. Determination of Condition. For contract modifications the contracting officer determines the equipment operating condition to be used based. This determination is based on the contract specifications, the site conditions, the basis of any supporting evidence, and APPENDIX C guidance. Evaluation of operating conditions for equipment not listed in APPENDIX C will be consistent with examples shown in APPENDIX C. The operating condition of the equipment relates to the average and severe factors as detailed in APPENDIX D, Equipment Hourly Expense Calculation Factors.

## SECTION III. EQUIPMENT SELECTION

2-6. General. Equipment shown in TABLE 2-1 is representative of equipment that is used in general construction. Note that some equipment may require additional attachments or accessories. Each unit of equipment is grouped into a main group called a Category (CAT) and a sub group called a Subcategory (SUB). This type of

grouping is displayed in Table 2-1 and Appendix D. Also an Identification Number (ID.NO.) is assigned to each unit of equipment. The ID.NO. consists of three parts. The first three characters is the CAT, the second two characters is the manufacturers code (Appendix H) and the last three characters is the sequence number.

2-7. Truck Selection. Because of the large number of possible combinations of highway truck chassis and bodies, both are listed separately. For estimating purposes, use the gross vehicle weight (GVW) rating of the truck chassis to make a selection, with the following conditions:

a. The combined weight of the truck chassis, truck body, and payload must not exceed the GVW rating shown for the truck chassis.

b. The gross combined weight (GCW) of the truck, trailer, and payload must not exceed the GCW rating shown.

2-8. Crawler Tractor Selection. Because of the various number of blade and ripper combinations available for each crawler tractor, all tractors include a blade attachment. Other blade and ripper attachments are shown separately. Only the hourly expense for those attachments that are required to perform the work shall be allowed.

2-9. Equipment Accessories. Equipment accessories included on the major pieces of equipment in TABLE 2-1 are listed in APPENDIX J, Equipment Accessories.

## SECTION IV. EQUIPMENT VALUE

2-10. List Price + Accessories. The total list price includes those accessories normally purchased by the contractor plus required safety features. Some units of equipment may no longer be manufactured; they will continue to be included in the pamphlet as representative models until equivalent replacement units can be identified.

2-11. Discount Code. A 7.5 percent discount is taken on the total list price plus accessories for all equipment except highway trucks that are discounted 15.0 percent. The identification of the discount is shown in APPENDIX D under column heading DC (Discount Code), where B equals the basic discount of 7.5 percent and S equals the special discount of 15.0 percent.

2-12. Sales or Import Tax. Total state sales tax (which includes local taxes) or import tax is computed as a percentage of the discounted price. The amount of tax is given in APPENDIX B.

2-13. Freight. Estimated allowances for freight are given in APPENDIX B. This allowance includes preparation and delivery. Multiply the shipping weight based on hundred weight (CWT) by the freight rate to determine freight charges.

2-14. Total Equipment Value (TEV). Freight is added to the total discounted price (which includes sales tax) to arrive at the TEV. The estimated TEV is indicated in TABLE 2-1 under the column heading VALUE.

## SECTION V. LIFE

2-15. Economic Life. LIFE is the expected economic life of the equipment and will vary based on the type of equipment and the condition of use. It is established from manufacturers' or equipment associations' recommendations. The expected economic life in hours is given in APPENDIX D, under the column heading LIFE, for both average and severe conditions.

2-16. Working Hours Per Year. Annual average operating hours has been established for equipment working within the region covered by this pamphlet. The number of working hours per year (WHPY) as shown in APPENDIX B is equivalent to one year's use for a single shift operation. Average hours of use per year are determined by reducing the maximum available hours per year (40 hours per week, 52 weeks per year) to allow for lost working days due to the following factors:

Weather
Employee holidays
Equipment maintenance and repairs
Mobilization and demobilization
Miscellaneous downtime

## SECTION VI. SALVAGE VALUE

2-17. Salvage Value (SLV). Salvage values for equipment are based on the *Green Guide for Construction Equipment, Handbook of New and Used Construction Equipment Values*, and advertisements of used equipment for sale as displayed in current engineering and construction magazines.

2-18. Salvage Value Percentages. The salvage value percentage used for each type of equipment is listed in APPENDIX D under the heading SLV as a percentage of the equipment value. It is equal for both average condition and severe condition.

## SECTION VII. OWNERSHIP COST

2-19. Ownership Elements. The ownership portion of the rate consists of allowances for depreciation (DEPR) and Facilities Capital Cost of Money (FCCM). These two cost elements are computed based on the total equipment value. Other ownership elements may be allowed (see paragraph 2-3.d.). Total ownership rate per hour is expressed by formula, as follows:

Ownership Rate/Hour = DEPR/Hour + FCCM/Hour

2-20. Depreciation. The straight-line method is used to compute depreciation.

a. For rubber-tired equipment, the tire cost index (TCI) must first be established to complete the depreciation formula in the sample worksheet.

b. Hourly Depreciation is calculated by dividing the “depreciable" value (total equipment value less estimated salvage and tire cost) by the expected economic life of the unit of equipment in hours. Expressed by formula, depreciation cost equals the following:

$$\text{DEPR/Hr} = \frac{[[(\text{TEV})(1-\text{SLV})] - [(\text{TCI})(\text{Tire Cost})]]}{\text{LIFE}}$$

Where:

(1) Total Equipment Value (TEV) - see TABLE 2-1

(2) Salvage Value (SLV) - see APPENDIX D

(3) Tire Cost Index (TCI) is determined by dividing the year-of-manufacture tire index by present-year tire index. These indexes are listed as part of APPENDIX E, Economic Indexes for Construction Equipment (see EK100, All Tires and Tubes).

(4) Tire Cost is the tire and conveyor belt cost. This is considered an operating expense and is subtracted from the total equipment value before computing depreciation. The tire cost for rubber-tired equipment is based on tire values taken at the time the equipment was manufactured. If tire costs based on the date of equipment manufacture are not known, present-year tire values are modified using the TCI. Estimated values for tires and conveyor belting, based on the date of the pamphlet, are provided in APPENDIX F, Tire Description and Tire Cost (this data is provided for information only). Since APPENDIX F does not contain pricing information for all types and sizes of tires and belts, dealers should be contacted for any additional information.

(5) LIFE is based on the number of operating hours throughout the economic life of the equipment (see paragraph 2-15). Hours for LIFE are provided in APPENDIX D.

2-21. Facilities Capital Cost of Money. Facilities Capital Cost of Money (FCCM), as defined in FAR 31.205-10 and CAS 414, is included in the total hourly rates. This cost was computed by multiplying the January 1999 cost-of-money rate (5.00%) determined by the Secretary of the Treasury pursuant to P.L. 92-41 (85 Stat. 97) by the average value of equipment and prorating the result over the annual operating hours. This cost-of-money rate was reduced 25.0% to avoid duplication when applying estimated markups for overhead and profit. The discounted FCCM rate is then 4.00%. The

Department of the Treasury adjusts the cost-of-money rate on or about 1 January and 1 July each year; these revisions are printed in the Federal Register. Expressed by formula, FCCM cost equals the following:

$$\text{FCCM/Hr} = \frac{\text{(TEV) (AVF) (FCCM)}}{\text{(WHPY)}}$$

Where:

(1) Average Value Factor (AVF) =[[(N-1) (1 + SLV)] + 2] / 2N

(2) Number of years (N) in depreciation period = LIFE / WHPY

(3) Current cost-of-money rate (FCCM) = (5.00%) / 1.25 = 4.00%

## SECTION VIII. OPERATING COST

2-22. Operating Cost Elements. The total operating cost is the sum of the following five elements: fuel, FOG (filters, oil, and grease), repairs, tire wear, and tire repair.

2-23. Fuel Cost. Fuel costs are computed for each gas, diesel, or electric engine. If the unit of equipment has two engines, as in the case of a truck crane, this methodology treats each engine separately for fuel costs. Fuel costs are calculated for each engine, as expressed in the following formula:

Fuel Cost/Hr = Fuel Factor x Horsepower x Fuel Cost/Gallon

a. Hourly Fuel Costs. The estimated hourly fuel cost for each unit of equipment is shown under the column heading FUEL in TABLE 2-1 and TABLE 2-2. If the unit of equipment has no engine, no fuel cost will be shown. See Chapter 3 for fuel adjustments.

b. Fuel Factor - Gas or Diesel Fuel. The fuel factor in gallons per bhp (brake horsepower) hour is listed in APPENDIX D for both average and severe conditions. Fuel factors are also listed for both the engine powering the main equipment (prime engine), and the engine providing power to the carrier vehicle. For severe conditions, the fuel consumption rate is 30 percent greater than the average conditions rate. Compute gas or diesel fuel factors by using the following formula:

$$\text{Fuel Factor (Gal/bhp-hr)} = \frac{\text{HPF x Lbs. Fuel per bhp-hr}}{\text{Lbs. of Fuel per Gallon}}$$

Where:

(1) Bhp is the net brake horsepower of the engine at the flywheel at sea level and at full-load governed speed. The engine is fully equipped with generator, fan, air cleaner,

and other regular equipment. All horsepower ratings for engine-driven equipment are listed with the equipment description in TABLE 2-1.

(2) HPF is the horsepower factor used in the fuel and electricity consumption formulas and represents an average percent of full rated horsepower being utilized by the engine. The fuel consumption factors, which are shown in APPENDIX D under column headings Fuel Factor-Equipment and Fuel Factor-Carrier, are computed based on the HPF shown under these column headings. This HPF is an estimate of the engine load under average working conditions. It is necessary to modify the rated horsepower as engines and motors in actual production do not work at their full-rated horsepower at all times. Periods spent at idle, travel in reverse, traveling empty, close maneuvering at part throttle, and operating downhill are examples of conditions that reduce the horsepower factor. Professional judgement regarding cycle time and equipment loading is applied to determine this average HPF. Normal field application can also vary according to: operator efficiency, type of material, type of work cycle, and overall job site efficiency. This pamphlet provides an estimated average HPF, not a specific factor.

(3) Fuel (consumed) per bhp-hr is an average based on a variety of engine applications from manufacturers engine data. The following constants represent an average of the normal application of equipment and are indicative of engine fuel consumption industry-wide.

Lbs. Fuel (consumed) per bhp-hr is based on the following estimate:

Gasoline = 0.60 lbs. per bhp-hr
Diesel = 0.36 lbs. per bhp-hr

Fuel weight per gallon is based on the following estimate:

Gasoline = 6.00 lbs. per gallon
Diesel = 7.00 lbs. per gallon

c. Fuel factor- Electricity. Assuming that an electric motor uses one kW/hp (considering all inefficiencies), and using the same HPF for gas or diesel fuel consumption, the electricity consumption is computed by the following formula:

Fuel Factor (kW/Hr) = HPF x 1 kW per electric hp hour

d. Fuel and Electricity Costs. The cost per gallon for gasoline and diesel fuel used to compute the hourly fuel costs are shown in APPENDIX B. The hourly fuel costs for all gasoline powered equipment, diesel powered highway trucks, and truck crane carriers include an allowance for federal and state road taxes, sales taxes, and rental for fuel storage tanks and pumps. Costs per kilowatt hour for electricity used to compute electricity costs are also shown in APPENDIX B.

2-24. Filter, Oil, and Grease (FOG) Cost. FOG cost is computed as a percentage of the hourly fuel costs.

a. The FOG element contains all items of cost for routine servicing of the equipment including the following:

Base wages for servicing labor
Fringe benefits and labor burden costs for servicing
Service truck, tools, and fuel truck allowance
Shop allowance when shop servicing is required
Other equipment costs for servicing
Filters, oil, and grease allowance
Taxes and shipping for FOG supplies
Handling and disposal of hazardous materials and oils

b. FOG cost is calculated for each engine using the following formula:

FOG Cost / Hr = FOG Factor x Fuel Cost/Hr x LAF

Where:

(1) FOG Factor is the percent allowance expressed as a decimal factor under each fuel type heading E (electricity), G (gas), or D (diesel). See APPENDIX D.

(2) Fuel Cost/Hr is a value calculated in paragraph 2-23.

(3) LAF (Labor Adjustment Factor) is a decimal factor used to adjust the FOG factor to account for regional variations in labor and parts costs. This factor is provided in APPENDIX B. LAF is also used to adjust the repair factor (RF) and the tire repair cost.

c. The FOG percentage allowance is reduced for servicing which is normally performed by the oiler who is assigned separately to the unit of equipment (and costed elsewhere). This reduction applies to the following equipment: cranes, draglines, hydraulic excavators, and shovels (except equipment under category numbers C75, C80.01, C85.11, C85.12, C85.21, C90.01, H25.11, H25.12, H30.01, H30.02, and M10.32)

d. When a unit of equipment has no engine (therefore no fuel costs calculated) and the equipment requires some type of fuel (i.e., propane, kerosene), an alternative hourly fuel/FOG allowance may be used in lieu of the regularly calculated fuel and FOG hourly costs. A FOG allowance may also be added when the equipment has no engine and has parts that require a FOG allowance. The alternative fuel allowance is added to the alternative FOG allowance for a total alternative fuel/FOG cost. (See Figure 2-1, 5.c)

2-25. Repair Cost. The repair cost is an allowance for equipment repairs, maintenance, and major overhauls (including undercarriage wear) performed in either the field or the shop. Where tire cost is the cost of the tires when the equipment was

manufactured, use the same TCI and tire cost as shown in the depreciation calculation (see paragraph 2-20). The estimated hourly rate for repairs is computed as follows:

$$\text{Repair Cost/Hr} = \frac{[(\text{TEV})-[(\text{TCI})(\text{Tire Cost})]] \times \text{Repair Factor}}{\text{LIFE}}$$

a. Repair Factor. The repair factor is calculated as follows:

Repair Factor (RF) = Repair cost factor (RCF) x EAF x LAF

b. Use the following multiplying factors to develop the repair factor:

(1) The repair cost factor (RCF) is shown in APPENDIX D. This factor varies depending on the operating condition of the equipment (average or severe).

(2) The economic adjustment factor (EAF) is used to adjust the repair cost factor to current price levels. The EAF is equal to the economic index for the present year divided by the economic index for the year the equipment was manufactured. APPENDIX E, Economic Indexes for Construction Equipment, is used to develop the EAF. Economic indexes are determined as follows:

(a) Economic Index for the Present Year. Find the present year and corresponding index in APPENDIX E for the type of equipment in question. If the index for the present year has not been included, future year indexes can be estimated using a straight-line projection.

(b) Economic Index for the Year of Manufacture. This is the economic index for the year the equipment was manufactured (can be determined from equipment serial numbers). Locate the index number in APPENDIX E for the year and type of equipment. If the actual age of the equipment is beyond the last year of its economic life the equipment is considered overage. Economic life is determined by dividing hours of LIFE (from APPENDIX D) by Working Hours Per Year (WHPY from APPENDIX B). Refer to Chapter 3 for rate adjustments.

c. Items Included in the Repair Cost Factor. The estimated percentage allowances for the repair cost factor are shown in APPENDIX D under the column heading RCF and are expressed as decimal factors. These repair cost factors (for both the average and severe conditions) compensate for the following cost elements:

(1) Mechanic’s labor includes base wages, fringe benefits, supervision, and all other costs for labor associated with craft workers engaged in the direct repair of equipment.

(2) Repair parts and supplies includes those items which are required for all repairs and major overhauls complete with applicable sales taxes and freight charges.

(3) Service trucks and other equipment used during repair and maintenance work, including tools.

(4) Supporting repair facilities includes field and main repair shops complete with parts and supplies inventory, and shop overhead.

2-26. Tire Cost. Tires included on rubber-tired equipment are generally the type and ply rating recommended as standard tires by the equipment manufacturer. Tire costs include both tire wear (replacement) and tire repair as individual elements of cost. Conveyor belt wear is also included under this cost element.

a. Tire Wear Cost. The formula for calculating tire wear applies to each tire position: front (FT), drive (DT), and trailing (TT). However, all tires performing the drive function are considered as drive tires and are listed in the DT position. The total hourly tire wear cost for each unit of equipment is the sum of the hourly cost for each position. The hourly tire wear cost equals the current cost of new tires plus the cost of one recapping divided by the expected life of the new tires plus the life of the recapped tires. This hourly allowance for determining tire wear cost is expressed in the following formula:

$$\frac{\text{Tire Cost Factor x Current Tire Cost}}{\text{Tire Life Factor x Tire Wear Factor x Maximum Tire Life}}$$

Where:

(1) Tire Cost Factor is estimated at 1.50, which represents the purchase of the original tire plus one recap. It has been estimated that a recap costs approximately 50 percent of the new tire cost.

(2) Current Tire Cost is the estimated cost that applies to all tires on the equipment in that position. For example, 4 new drive tires valued at $500 each would result in an amount of $2,000 for total drive tire cost. The size and cost of each tire used in the pamphlet are listed for information in APPENDIX F.

(3) Tire Life Factor is estimated at 1.80, which represents the purchase of the original tire plus one recap. It has been estimated that a recap lasts approximately 80 percent of the life of a new tire.

(4) Tire Wear Factor is based on the position of the tire, type of equipment, and condition of use, tire wear factors have been developed and are listed in APPENDIX D. These factors will provide a percentage reduction to the maximum tire life. APPENDIX G, Tire Life and Tire Wear Factors, contains the methodology used to develop these factors and a computation example for a rear dump wagon.

(5) Maximum Tire Life expressed in hours is shown for various new tire types in APPENDIX F and APPENDIX G. The tire life is estimated from information provided by Goodyear Tire and Rubber Co. and by using the method and tables in “Production and

Cost Estimating of Material Movement with Earthmoving Equipment" prepared by Terex Division of General Motors.

b. Tire Repair Cost. It has been estimated that tire repairs are 15 percent of the total hourly tire wear cost. LAF is used to adjust the tire repair cost to account for regional variations in labor and parts costs. This cost element has been calculated and listed separately in TABLE 2-2. It is expressed as a formula as follows:

Tire Repair Cost = Total Tire Wear Cost x .15 x LAF

c. Belt Cost is for equipment that uses conveyor belts. The belt wear is treated like tire wear. The wear factors are listed in the front tire wear factor column in APPENDIX D. Belt life is shown in APPENDIX F and APPENDIX G, and belt cost is listed in APPENDIX F.

## SECTION IX. STANDBY HOURLY RATE

2-27. Standby Hourly Rate. The standby rate is computed from the average condition by allowing the full FCCM hourly cost plus one-half of the hourly depreciation. It is expressed as a formula, as follows:

Standby Rate/Hr = (DEPR/Hr x .50) + FCCM/Hr

a. Paid standby shall not exceed 40 hours per week (7 calendar days) per unit of equipment. Actual operating hours during a week will be credited against the 40 hours maximum standby allowance.

b. Standby will not be allowed during periods when the equipment would have otherwise been in idle status.

c. When the equipment is purchased used, standby will be computed on the basis that the equipment was purchased new by the contractor in the year it was actually manufactured. Refer to Chapter 3 for rate adjustments.

## SECTION X. RATE CALCULATION EXAMPLE

2-28. Computation Example. Figure 2-1, Equipment Rate Computation Worksheet, is an example of how the total hourly rates in TABLE 2-1 are computed. A blank Equipment Rate Computation Worksheet is included in Appendix A and can be copied as needed.

a. When an hourly rate for a specific unit of equipment is not included in this pamphlet and a rate must be computed, the methodology contained in Chapter 2 shall be followed. However, when a unit of equipment is not included in the pamphlet and the

necessary factors to compute a rate are not found in APPPENDIX D, please call for assistance as explained in Chapter 1. Software **(CHECKRATE)** is also available for rate computation (see Chapter 1).

b. See Chapter 3, Adjustments to Rates, for further guidance on the procedure for rate adjustments.

**Use this blank worksheet to compute rates for equipment that are not in this pamphlet.**

***EXAMPLE: THE PIECE OF EQUIPMENT SHOWN IS BASED ON A KNOWN PIECE OF EQUIPMENT FOR ILLUSTRATION PURPOSES ONLY. (SEE CHAPTER 2)***

## 1. EQUIPMENT INFORMATION & EXPENSE FACTORS

***For ID No:*** C90AM001

**a.** Equipment Specification Data:

**(1)** Equipment Description: CRANE, MECHANICAL, TRUCK MTD, AMERICAN CRANE

**(2)** Model and Series: 5530, 75 TON, W/170' BOOM

**(3)** Present Year or Year of Use: 1999

**(4)** Year Manufactured: 1996

**(5)** Horsepower - Equipment: 128

**(6)** Horsepower - Carrier: 238

**(7)** Fuel type: - Equipment: gas / diesel off-road / diesel on-road / electric / air D-off

- Carrier: gas / diesel off-road / diesel on-road / electric / air D-on

**(8)** Shipping Weight (CWT): 1245 CWT

**(9)** Tire size and number of tires:(Cost of tires based on present year-see 1.a.(3) & APPENDIX F)

**(a)** Front: No.: 4 Size/Ply: 14.00X20/20 Cost: $ 2,184

**(b)** Drive: No.: 8 Size/Ply: 14.00X20/20 Cost: $ 4,368

**(c)** Trailing: No.: N/A Size/Ply: _____ Cost: $ 0

**(d)** Total Tire Cost: $ 6,552

**USE APPENDIX D TO COMPLETE THE FOLLOWING DATA:**

**b.** Category and Sub-category Number: C90 - 0.03

**c.** Hourly Expense Calculation Factors:

**(1)** Economic Key (E K): 20

**(2)** Condition (C): Average or Severe AVERAGE

**(3)** Discount Code (DC): B = 7.5% (0.075) - or - S = 15.0% (0.15) B = 0.075

**(4)** Life in Hours (LIFE): 18,000

**(5)** Salvage Value Percentage (SLV): 0.15

**(6)** Fuel Factor - Equipment (E G D): 0.026

**(7)** Fuel Factor - Carrier (E G D): 0.005

**(8)** FOG Factor (E G D): 0.276

**(9)** Tire Wear Factor:

**(a)** Front (FT): 0.97

**(b)** Drive (DT): 0.78

**(c)** Trailing (TT): N/A

**(10)** Repair Cost Factor (RCF): 0.80

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**Figure 2-1. Equipment Rate Computation Worksheet**

## 2. EQUIPMENT VALUE

**a.** List Price + Accessories: (*at Year of Manufacture*) = $ 733,425

**(1)** Discount: ( List Price + Accessories ) x ( Discount Code )
[ 1.c.(3)]

( 733,425 ) x ( 0.075 ) = -($ 55,007 )

**(2)** Subtotal [ 2.a. ] - [ 2.a.(1) ] S/T = $ 678,418

**(3)** Sales or Import Tax: ( Subtotal ) x ( Tax Rate )
[ 2.a.(2) ] [ APPENDIX B]

( 678,418 ) x ( 0.071 ) = +$ 48,168

**(4)** Total Discounted Price: Subtotal: [2.a.(2)] + [2.a.(3)] S/T = $ 726,585

**b.** Freight: ( Shipping Weight ) x ( Freight Rate per CWT )
[ 1.a.(8) ] [ APPENDIX B]

( 1245 CWT) x ( 2.36 ) = +$ 2,938

**c. TOTAL EQUIPMENT VALUE (TEV)**: **2. TOTAL: = $** 729,524
[ (2.a.(4) ] + [ (2.b) ]
*(See Chapter 3 for used and overage equipment rate adjustments.)*

## 3. DEPRECIATION PERIOD (N)

**a.** ( LIFE ) / (Working Hours Per Year ( WHPY )) = N
[ 1.c.(4) ] [ APPENDIX B ]

( 18,000 Hrs) / ( 1400 Hrs/Yr) **3. TOTAL:** = 12.86 Yrs(N)

## 4. OWNERSHIP COST

**a.** Depreciation

**(1)** Tire Cost Index ( TCI ):

( Tire Index, Yr of Mfgr ) / Tire Index, Based on 1a.(3)) = Tire Cost Index ( TCI )
[ APPENDIX E, EK=100 ] [ APPENDIX E, EK=100 ]

( 2475 ) / ( 2400 ) = 1.031 ( TCI )

**(2) [** ( TEV ) x **[** 1.0 - (SLV) **]** - **[** ( TCI ) x ( Tire Cost ) **]]** / ( LIFE )
[ 2.c. ] [ 1.c.(5) ] [ 4.a. (1) ] [ 1.a.(9)(d)] [ 1.c.(4) ]

**[** ( 729,524 ) x **[** 1.0 - ( 0.15 ) **]** - **[** ( 1.031 ) x ( 6,552 **]]** / ( 18,000 )

= $ 34.07 **/Hr**



**Figure 2-1. Equipment Rate Computation Worksheet**

## 4. OWNERSHIP COST (Continued)

**b.** Facilities Capital Cost of Money (FCCM):

**(1) [ [** ( N [ 3.a. ] ) -1.0 **]** x **[** 1.0 + (SLV) [ 1.c.5. ] **]** + 2.0 **]** / **[** 2.0 x ( N [ 3.a. ] ) **]** = Avg Value Factor (AVF)

**[ [**(12.86 Yrs) - 1.0 **]** x **[** 1.0 +( 0.15 ) **]** + 2.0 **]** / **[** 2.0 x ( 12.86 Yrs) **]** = 0.608 (AVF)

**(2)** ( TEV [ 2.c. ] ) x ( AVF [ 4.b.(1) ] ) x (Adjusted Cost-of-Money [ APPENDIX B ]) / ( WHPY [ APPENDIX B ] )

( 729,524 ) x (0.608) x ( 0.040 ) / ( 1400 Hrs/Yr) = $ 12.67 **/Hr**

**c. TOTAL HOURLY OWNERSHIP COST:** [ 4.a.(2) ] + [ 4.b.(2) ] **4. TOTAL:** = $ 46.74 **/Hr**

## 5. OPERATING COST

**a.** Fuel Cost:

**(1)** Equipment:

( Fuel Factor [ 1.c.(6) ] ) x ( Horsepower [ 1.a.(5) ] ) x ( Fuel Cost Per Gallon [ APPENDIX B ] )

( 0.026 ) x ( 128 HP) x ( 0.80 /Gal ) = $ 2.66 **/Hr**

**(2)** Carrier:

( Fuel Factor [ 1.c.(7) ] ) x ( Horsepower [ 1.a.(6) ] ) x ( Fuel Cost Per Gallon [ APPENDIX B ] )

( 0.005 ) x ( 238 HP) x ( 1.04 /Gal ) = $ 1.24 **/Hr**

**(3)** Total Hourly Fuel Cost [ (5.a (1) ] + [ 5.a (2) ] Total 5.a. = $ 3.90 **/Hr**

**b.** FOG Cost:

**(1)** Equipment:

( FOG Factor [ 1.c.(8) ] ) x ( Equipment Fuel Cost [ 5.a.(1) ] ) x ( LAF [ APPENDIX B ] )

( 0.276 ) x ( 2.66 /Hr ) x ( 0.96 ) = $ 0.70 **/Hr**



**Figure 2-1. Equipment Rate Computation Worksheet**

## 5. OPERATING COST (Continued)

**(2)** Carrier:

( FOG Factor ) x ( Carrier Fuel Cost ) x ( LAF )
[ 1.c.(8) ] [ 5.a.(2) ] [ APPENDIX B ]

( 0.276 ) x ( 1.24 /Hr) x ( 0.96 ) = $ 0.33 **/Hr**

**(3)** Total Hourly FOG Cost: Total 5.b. = $ 1.03 **/Hr**
[ (5.b.(1) ] + [ 5.b.(2) ]

**c.** Alternative Fuel/FOG Cost: Total 5.c. = $ 0 **/Hr**
*(See Chapter 2, paragraph 24.d. for guidance on when to use.)*

**d.** Repair Cost:

**(1)** Economic Adjustment Factor (EAF) :
( EK is from [1 c. (1) ] )

( Economic Index for Year 1a.(3)) / ( Economic Index for Year 1a.(4))
[ APPENDIX E ] [ APPENDIX E ]

( 5343 ) / ( 5013 ) = 1.066 (EAF)

(See TABLE 3-2 for last year of economic life)

**(2)** Repair Factor (RF):

( RCF ) x ( EAF ) x ( LAF ) = Repair Factor (RF)
[ 1.c.(10) ] [ 5.d.(1). ] [ APPENDIX B ]

( 0.80 ) x ( 1.066 ) x ( 0.96 ) = 0.819 (RF)

**(3)** Repair Cost

**[** ( TEV ) - **[** ( TCI ) x ( Tire Cost ) **]]** x ( RF ) / ( LIFE )
[ 2.c. ] [ 4.a. (1) ] [ 1.a.(9)(d) ] [ 5.d.(2) ] [ 1.c.(4) ]

**[** ( 729,524 ) - **[** ( 1.031 ) x ( 6,552 ) **]]** x ( 0.819 ) / ( 18,000 )

**(4)** Total Hourly Repair Cost: Total 5.d. = $ 32.89 **/Hr**

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**Figure 2-1. Equipment Rate Computation Worksheet**

## 5. OPERATING COST (Continued)

**e.** Tire Wear Cost: *(Use current price levels. See APPENDIX F.)*

**(1)** Front Tires:

**[** 1.5 x ( FT Cost ) **]** / **[** 1.8 x ( FT Wear Factor ) x ( Maximum Tire Life/Hrs ) **]**
[ 1.a.(9)(a) ] [ 1.c.(9)(a) ] [ APPENDIX G ]

**[** 1.5 x ( 2,184 ) **]** / **[** 1.8 x ( 0.97 ) x ( 5000 /Hrs ) **]**
= $ 0.38 **/Hr**

**(2)** Drive Tires:

**[** 1.5 x ( DT Cost ) **]** / **[** 1.8 x ( DT Wear Factor) x ( Maximum Tire Life/Hrs ) **]**
[ 1.a.(9)(b) ] [ 1.c.(9)(b) ] [ APPENDIX G ]

**[** 1.5 x ( 4,368 ) **]** / **[** 1.8 x ( 0.78 ) x ( 5000 /Hrs ) **]**
= $ 0.93 **/Hr**

**(3)** Trailing Tires:

**[** 1.5 x ( TT Cost ) **]** / **[** 1.8 x ( TT Wear Factor ) x ( Maximum Tire Life/Hrs) **]**
[ 1.a.(9)(c) ] [ 1.c.(9)(c) ] [ APPENDIX G ]

**[** 1.5 x ( 0 ) **]** / **[** 1.8 x ( 0 ) x ( 0 /Hrs) **]**
= $ 0 **/Hr**

**(4)** Total Tire Wear Cost
[ Sum 5.e.(1) through 5.e.(3) ]
Total 5.e. = $ 1.31 **/Hr**

**f.** Tire Repair Cost:

(Total Tire Wear Cost) x 0.15 x ( LAF )
[ 5.e.(4) ] [ APPENDIX B ]

( 1.31 ) x 0.15 x ( 0.96 ) Total 5.f. = $ 0.19 **/Hr**

**g. TOTAL HOURLY OPERATING COST**:
[ Sum 5.a. through 5.f. ]
**5. TOTAL: =$** 39.27 **/Hr**



**Figure 2-1. Equipment Rate Computation Worksheet**

## 6. HOURLY RATES

**a. Total Hourly Rate:** *(based on 40 hours per week)*

( Ownership Cost ) + ( Operating Cost )
[ 4.c. ] [ 5.g ]

( 46.74 /Hr ) + ( 39.32 /Hr )

**= $ 86.06 /Hr**

**b. Other Work Shifts Hourly Rate :**
*(Refer to Chapter 3, Adjustments to Rates, for methodology.)*

**[** ( Depreciation ) + **[** ( FCCM ) x ( 40 hrs/wk ) / ( Work Hrs/wk ) **]** + (Operating Cost) **]**
[ 4. a. (2) ] [ 4. b. (2) ] ( example: 60 hrs/wk) [5.g ]

**[** ( 34.07 /Hr) + **[** ( 12.67 / Hr) x ( 40 Hrs/wk ) / ( 60 Hrs/wk ) **]** + ( 39.32 /Hr) **]**

**= $ 81.84 /Hr**

**c. Standby Hourly Rate:**

**[** ( Depreciation ) x 0.50 **]** + ( FCCM )
[ 4.a.(2) ] [ 4.b.(2) ]

**[** ( 34.07 /Hr) x 0.50 **]** + ( 12.67 /Hr)

**= $ 29.71 /Hr**

**See Chapter 3 if rate adjustments are necessary.**

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**Figure 2-1. Equipment Rate Computation Worksheet**